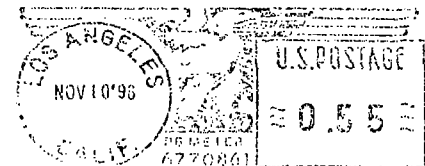




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RELIANCE STEEL & ALUMINUM CO.

P.O. BOX 60482
TERMINAL ANNEX
LOS ANGELES, CA 90060



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IMPORTANT
Material Safety Data Sheets

Environmental
Cleanup Office

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Corporate Offices: 2550 East 25th Street, Los Angeles, California □ 213/582-2272
Mailing Address: P.O. Box 60482, Los Angeles, California 90060

RELIANCE STEEL & ALUMINUM CO.

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MAY 19 2008

Environmental
Cleanup Office

OCTOBER 1, 1997

Attention: Health and Safety Department
RE: Material Safety Data Sheets

Attached please find Material Safety Data Sheets (MSDS) for materials provided by Reliance Steel & Aluminum Co. These Data Sheets were prepared in response to the OSHA Hazard Communication Standard (29 CFR1910.1200) and various state and local "right-to-know" laws which require that distributors of metal products provide MSDS Sheets, which contain health and safety information on the products they sell and on the ingredients of those products.

The information contained herein is intended to be used for Employee Health and Safety Education Training, and not for specification purposes.

The products provided by Reliance Steel & Aluminum Co. in their solid state present no fire, explosion, inhalation, ingestion or contact health hazard under normal conditions of use, storage or transport. However, burning, welding, brazing, sawing, grinding and machining, which results in elevating the temperature of the product to or above the melting point or results in the generation of airborne particles may present health hazards. Metallic dust, especially aluminum, can be a potential fire hazard. Metallic Oxide fumes in high concentrations can be hazardous if chronically inhaled. Metals react with acids, alkalies and strong oxidizers to generate heat and/or hydrogen gas.

The Material Safety Data Sheets prepared by Reliance Steel & Aluminum Co. summarize the product health and safety information provided to us by our vendors. Should you require original Material Safety Data Sheets, contact your local Reliance Steel & Aluminum Co. distributor.

John G. Peterson
Director, Safety, Engineering and Quality

MATERIAL SAFETY DATA SHEET

TRADE NAME (Common Name Or Synonym)
CARBON AND ALLOY STEELS

CHEMICAL NAME
AISI/SAE Grades 10xx thru 93xx

I. INGREDIENTS

Material Or Component	CAS Number	% Weight	8 Hour TWA OSHA PEL (mg/m ³)	EXPOSURE LIMITS	8 Hour TWA ACGIH TLV (mg/m ³)	NTP Listed	IARC Listed
<u>Base Metal</u> Iron (Fe)	7439-89-6	86.5-99.5	Dust Fume - 10		Dust Fume - 5	No	No
<u>Alloying Elements</u> Aluminum (Al) Bismuth (Bi) Boron (B) Carbon (C)	7429-90-5 7440-69-9 7440-42-8 7440-44-0	0.1-0.5 0.2-0.5 .01-1.0 .10-1.5	15 - NA NA - 15 NA NA		10 5 NA NA - 10 3.5 -	No No No No	No No No No
Chromium (Cr) Columbium (Cb) Copper (Cu) Lead (Pb)	7440-47-3 7440-03-1 7440-50-8 7439-92-1	.40-10 .15-.35 .30-1.90 .01-.15	1.0 - NA NA 1.0 1.0 .05 .05		.5 - NA NA 1.0 1.0 .15 .15	Yes No No No	Yes No No Yes
Manganese (Mn) Molybdenum (Mo) Nickel (Ni) Phosphorous (P)	7439-96-5 7439-98-7 7440-02-0 7723-14-0	.04-0.7 15-1.10 .01-10 .040-.12	5 5 15 - 1 - 0.1 0.1		5 1 15 - 1 - 0.1 0.1	No No Yes No	No No Yes No
Silicon (Si) Sulfur (s) Vanadium (V) Zinc Coating	7440-21-3 7704-34-9 7440-62-2 1314-13-2	.15-2.00 .050-.35 .01-0.15 2.0Z/ft ²	15 - - 15 .5 .1 - 5		10 - - 5 0.05 0.05 10 5	No No No No	No No No No
Aluminum Coating	7429-90-5	.5 oz/ft ²	NA NA		10 5	No	No

NOTE: The above listing is a summary of elements used in alloying steel. Various grades of steel will contain different combinations of these elements. Trace elements may also be present in minute amounts. No permissible exposure limits (PEL) or thresholds limit values (TLV) exist for steel. Values shown are applicable to components elements.

II. PHYSICAL DATA

MATERIAL IS (At Normal Conditions) () LIQUID (X) SOLID () GAS () OTHER	APPEARANCE AND ODOR GREY-BLACK, ODORLESS	% VOLATILE BY VOLUME N/A	VAPOR DENSITY N/A
ACIDITY/ALKALINITY pH = N/A	Melting Point Approx. 2800°F Boiling Point N/A °F	Specific Gravity (H ₂ O = 1) Approx. 7 Solubility in water (% by weight) N/A	VAPOR PRESSURE (MM Hg AT 20°C) N/A

III. PERSONAL PROTECTIVE EQUIPMENT

RESPIRATORY PROTECTION. Appropriate dust/mist/fume respirator should be used to avoid excessive inhalation of particulates. If exposure limits are reached or exceeded, use NIOSH approved equipment.	HANDS, ARMS AND BODY. Protective gloves should be worn as required for welding, burning or handling operations.
EYES AND FACE. Safety glasses should be worn when grinding or cutting. Face shields should be worn when welding or cutting or burning.	OTHER CLOTHING AND EQUIPMENT. As required depending on operations and safety codes.

IV. EMERGENCY MEDICAL PROCEDURES

INHALATION:	Remove to fresh air; if condition continues, consult a physician.
EYE CONTACT:	Flush thoroughly with running water to remove particulate; obtain medical attention.
SKIN CONTACT:	Remove particles by washing thoroughly with soap and water. Seek medical attention if condition persists.
INGESTION:	If significant amounts of metal are ingested, consult physician.

V. HEALTH/SAFETY INFORMATION

HEALTH	<p>Steel products in their solid state present no inhalation, ingestion, or contact health hazard. Operations such as burning, welding, sawing, brazing, grinding, and machining, which result in elevating the temperature of the product to, or above its melting point, or result in the generation of airborne particulates may present hazards. The major exposure hazard is inhalation. Effects or overexposure to fume and dust are as follows:</p> <p>ACUTE: Excessive inhalation of metallic fumes and dust may result in irritation of eyes, nose and throat. High concentrations of fumes and dust of iron-oxide, manganese, copper and lead may result in metal fume fever. Typical symptoms last from 12 to 48 hours and consist of a metallic taste in the mouth, dryness and irritation of the throat, chills and fever.</p> <p>CHRONIC: Chronic and prolonged inhalation of high concentrations of fumes or dust of the following elements may lead to the conditions listed opposite the element:</p> <p>Aluminum: May initiate fibrotic changes to lung tissue Bismuth: No chronic debilitating symptoms indicated Boron: No chronic debilitating symptoms indicated Chromium: Lesions of the skin and mucous membranes, possible cancer of the nose or lungs-bronchogenic carcinoma Copper: No chronic debilitating symptoms indicated Iron: Siderosis, pulmonary effects. No chronic debilitating symptoms indicated. Lead: Anemia, urinary dysfunction, weakness, constipation, nausea, nervous disorder Manganese: Bronchitis, lack of coordination Molybdenum: Respiratory tract irritation, possible liver and kidney damage, bone deformity Nickel: Lesions of the skin and mucous membranes, possible cancer of the nose or lungs-bronchogenic carcinoma Phosphorous: Necrosis of the mandible Sulfur: (As sulfur dioxide) Edema of the lungs Vanadium: (As vanadium pentoxide) Emphysema, pneumonia Zinc: Gastrointestinal inflammation reported in animal studies</p> <p>MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Individuals with chronic respiratory disorders (i.e.: asthma, chronic bronchitis, emphysema, etc.) may be adversely affected by any fume or airborne particulate matter exposure.</p> <p>OCCUPATIONAL EXPOSURE LIMITS: See Product Ingredients Section I. Chromium and Nickel have been identified by the International Agency for Research on Cancer (IARC) and/or the National Toxicology Program (NTP) as potential cancer causing agents.</p>			
FIRE & EXPLOSION	<p>FLASH POINT N/A °F</p>		<p>AUTO IGNITION TEMPERATURE N/A</p>	
	<p>FLAMMABLE LIMITS IN AIR Lower N/A % Upper N/A %</p>		<p>EXTINGUISHING MEDIA For molten metal use dry powder or sand.</p>	
FIRE & EXPLOSION	<p>FIRE AND EXPLOSION HAZARDS Steel products do not present fire or explosion hazards under normal conditions. Fine metal particles such as produced in grinding or sawing can burn. High concentrations of metallic fines in the air may present an explosion hazard.</p>		<p>EXTINGUISHING MEDIA Do not use water on molten metal.</p>	
REACTIVITY	<p>STABILITY Stable (X) Unstable ()</p>		<p>INCOMPATIBILITY (MATERIALS TO AVOID) Reacts with strong acids to form hydrogen gas.</p>	
	<p>CONDITIONS TO AVOID: Steel at temperatures above the melting point may liberate fume containing oxides of iron and alloying elements. Avoid generation of airborne fume dust.</p>			
REACTIVITY	<p>HAZARDOUS DECOMPOSITION PRODUCTS: Metallic Dust or fumes may be produced during welding, burning grinding and possible machining. Refer to ANSI Z49.1.</p>			

VI. ENVIRONMENTAL

SPILL OR LEAK PROCEDURES Fine turnings and small chips should be swept or vacuumed. Scrap metal can be reclaimed for re-use.	
WASTE DISPOSAL METHOD* Used or unused product should be disposed of in accordance with Federal, State or Local Laws and Regulations. *Disposer must comply with Federal, State and Local disposal or discharge laws.	

VII. ADDITIONAL INFORMATION

In welding, precautions should be taken for airborne contaminants which may originate from components of the welding rod.	
Arc or spark generated when welding or burning could be a source of ignition for combustion and flammable materials.	
DISCLAIMER The information in this MSDS was obtained from sources which we believe are reliable, however, the information is provided without any representation or warranty, expressed or implied, regarding the accuracy or correctness. The conditions or methods of handling, storage, use and disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of the product.	

MATERIAL SAFETY DATA SHEET

TRADE NAME (Common Name Or Synonym)
GALVANIZED

CHEMICAL NAME
GALVANIZED

I. INGREDIENTS

Material Or Component	CAS Number	% Weight	8 Hour TWA OSHA PEL (mg/m³)		EXPOSURE LIMITS 8 Hour TWA ACGIH TLV (mg/m³)		NTP Listed	IARC Listed
<u>Base Metal</u> Iron (Fe)	1309-37-1	85.4-90.0	<u>Dust</u> -	<u>Fume</u> 10	<u>Dust</u> 0	<u>Fume</u> 5	No	No
<u>Alloying Elements</u>								
Aluminum (Al)	7429-90-5	0.1-0.5	15	-	10	5	No	No
Carbon (C)	7440-44-0	.25	NA	NA	3.5	-	No	No
Columbium (Cb)	7440-03-1	.10	10	5	10	10	No	No
Rare Earth (Ce)	7440-46-2	.10	15	5	10	10	No	No
<u>Manganese (Mn)</u>	7439-96-5	.05-1.90	1	3	1	3	No	No
<u>Phosphorous (P)</u>	7723-14-0	.15	.1	-	.1	-	No	No
<u>Sulfur (S)</u>	7704-34-9	.05	-	15	-	10	No	No
<u>Titanium (Ti)</u>	7440-32-6	.30	15	5	10	10	No	No
<u>Vanadium (V)</u>	7440-62-2	.20	.5	.1	0.05	0.05	No	No
<u>Metallic Coating</u>								
Aluminum	7429-90-5	.04	15	.5	10	5	No	No
Antimony	7410-36-0	.02	.5	-	.5	-	No	No
Iron	1309-37-1	.1-1.5	10	-	5	-	No	No
Lead	7439-92-1	.02	.05	.05	.15	.15	No	Yes
<u>Zinc</u>	1314-13-2	.20	-	5	10	5	No	No

NOTE: The above listing is a summary of elements used in alloying steel. Various grades of steel will contain different combinations of these elements. Trace elements may also be present in minute amounts. No permissible exposure limits (PEL) or thresholds limit values (TLV) exist for steel. Values shown are applicable to components elements.

II. PHYSICAL DATA

MATERIAL IS (At Normal Conditions) () LIQUID (X) SOLID () GAS () OTHER	APPEARANCE AND ODOR GREY-BLACK, ODORLESS	% VOLATILE BY VOLUME N/A	VAPOR DENSITY N/A
ACIDITY/ALKALINITY pH = N/A	Melting Point Base Metal Approx. 2800°F Melting Point Metallic Coating 800°F	Specific Gravity (H ₂ O = 1) Approx. 7 Solubility in water (% by weight) N/A	VAPOR PRESSURE (MM Hg AT 20°C) N/A

III. PERSONAL PROTECTIVE EQUIPMENT

RESPIRATORY PROTECTION. Appropriate dust/mis/fume respirator should be used to avoid excessive inhalation of particulates. If exposure limits are reached or exceeded, use NIOSH approved equipment.	HANDS, ARMS AND BODY. Protective gloves should be worn as required for welding, burning or handling operations.
EYES AND FACE. Safety glasses should be worn when grinding or cutting. Face shields should be worn when welding or cutting or burning.	OTHER CLOTHING AND EQUIPMENT. As required depending on operations and safety codes.

IV. EMERGENCY MEDICAL PROCEDURES

INHALATION: Remove to fresh air; if condition continues, consult a physician.
EYE CONTACT: Flush thoroughly with running water to remove particulate; obtain medical attention.
SKIN CONTACT: Remove particles by washing thoroughly with soap and water. Seek medical attention if condition persists.
INGESTION: If significant amounts of metal are ingested, consult physician.

V. HEALTH/SAFETY INFORMATION

HEALTH	Steel products in their solid state present no inhalation, ingestion, or contact health hazard. Operations such as burning, welding, sawing, brazing, grinding, and machining, which result in elevating the temperature of the product to, or above its melting point, or result in the generation of airborne particulates may present hazards. The major exposure hazard is inhalation. Effects or overexposure to fume and dust are as follows:			
	<p>ACUTE: Excessive inhalation of metallic fumes and dust may result in irritation of eyes, nose and throat. High concentrations of fumes and dust of iron-oxide, manganese, copper and lead may result in metal fume fever. Typical symptoms last from 12 to 48 hours and consist of a metallic taste in the mouth, dryness and irritation of the throat, chills and fever.</p> <p>CHRONIC: Chronic and prolonged inhalation of high concentrations of fumes or dust of the following elements may lead to the conditions listed opposite the element:</p> <p>Aluminum: May initiate fibrotic changes to lung tissue Bismuth: No chronic debilitating symptoms indicated Boron: No chronic debilitating symptoms indicated Chromium: Lesions of the skin and mucous membranes, possible cancer of the nose or lungs-bronchogenic carcinoma Copper: No chronic debilitating symptoms indicated Iron: Siderosis, pulmonary effects. No chronic debilitating symptoms indicated. Lead: Anemia, urinary dysfunction, weakness, constipation, nausea, nervous disorder Manganese: Bronchitis, lack of coordination Molybdenum: Respiratory tract irritation, possible liver and kidney damage, bone deformity Nickel: Lesions of the skin and mucous membranes, possible cancer of the nose or lungs-bronchogenic carcinoma Phosphorous: Necrosis of the mandible Sulfur: (As sulfur dioxide) Edema of the lungs Vanadium: (As vanadium pentoxide) Emphysema, pneumonia Zinc: Gastrointestinal inflammation reported in animal studies</p> <p>MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Individuals with chronic respiratory disorders (i.e.: asthma, chronic bronchitis, emphysema, etc.) may be adversely affected by any fume or airborne particulate matter exposure.</p> <p>OCCUPATIONAL EXPOSURE LIMITS: See Product Ingredients Section I. Chromium Nickel and lead have been identified by the International Agency for Research on Cancer (IARC) and/or the National Toxicology Program (NTP) as potential cancer causing agents.</p>			
FIRE & EXPLOSION	FLASH POINT N/A °F	AUTO IGNITION TEMPERATURE N/A	FLAMMABLE LIMITS IN AIR Lower N/A % Upper N/A %	EXTINGUISHING MEDIA For molten metal use dry powder or sand.
	FIRE AND EXPLOSION HAZARDS Steel products do not present fire or explosion hazards under normal conditions. Fine metal particles such as produced in grinding or sawing can burn. High concentrations of metallic fines in the air may present an explosion hazard.			EXTINGUISHING MEDIA Do not use water on molten metal.
REACTIVITY	STABILITY Stable (X) Unstable ()		INCOMPATIBILITY (MATERIALS TO AVOID) Reacts with strong acids to form hydrogen gas.	
	CONDITIONS TO AVOID: Steel at temperatures above the melting point may liberate fume containing oxides of iron and alloying elements. Avoid generation of airborne fume and dust.			
HAZARDOUS DECOMPOSITION PRODUCTS: Metallic Dust or fumes may be produced during welding, burning grinding and possible machining. Refer to ANSI Z49.1.				

VI. ENVIRONMENTAL

SPILL OR LEAK PROCEDURES Fine turnings and small chips should be swept or vacuumed. Scrap metal can be reclaimed for re-use.	
WASTE DISPOSAL METHOD* Used or unused product should be disposed of in accordance with Federal, State or Local Laws and Regulations. *Disposer must comply with Federal, State and Local disposal or discharge laws.	

VII. ADDITIONAL INFORMATION

In welding, precautions should be taken for airborne contaminants which may originate from components of the welding rod.	
Arc or spark generated when welding or burning could be a source of ignition for combustion and flammable materials.	
DISCLAIMER The information in this MSDS was obtained from sources which we believe are reliable, however, the information is provided without any representation or warranty, expressed or implied, regarding the accuracy or correctness. The conditions or methods of handling, storage, use and disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of the product.	

MATERIAL SAFETY DATA SHEET

TRADE NAME (Common Name Or Synonym)
STAINLESS STEELS

CHEMICAL NAME
AISI/SAE Grades 300 Series, 400 Series, Special Alloys

I. INGREDIENTS

Material Or Component	CAS Number	% Weight	8 Hour TWA OSHA PEL (mg/m ³)	EXPOSURE LIMITS	8 Hour TWA ACGIH TLV (mg/m ³)	NTP Listed	IARC Listed
<u>Base Metal</u> Iron (Fe)	7439-89-6	38.0-86.5	<u>Dust</u> -	<u>Fume</u> 10	<u>Dust</u> -	<u>Fume</u> 5	No No
<u>Alloying Elements</u> Aluminum (Al)	7429-90-5	0.1-0.5	15	-	10	5	No No
Carbon (C)	7440-44-0	.10-1.5	NA	NA	3.5	-	No No
Chromium (Cr)	7440-47-3	10-27	1.0	-	-	5	Yes No
Cobalt (Co)	7440-48-4	.01-75	.1	-	-	.05	No No
Columbium (Cb)	7440-03-1	.01-1.10	NA	NA	NA	NA	No No
Copper (Cu)	7440-50-8	.18-4.5	1.0	.1	1.0	.2	Yes No
Manganese (Mn)	7439-96-5	2-10	5	5	5	1	No No
Molybdenum (Mo)	7439-98-7	.04-5	15	-	15	-	No No
Nickel (Ni)	7440-02-0	12-34	1	-	1	-	Yes No
Phosphorous (P)	7723-14-0	.01-.06	.1	-	.1	-	No No
Selenium (Se)	7782-49-2	.01-0.3	.2	-	.2	-	No No
Silicon (Si)	7440-21-3	.15-2.0	15	-	10	-	No No
Sulfur (S)	7704-34-9	.01-.06	-	15	-	5	No No
Tantalum (Ta)	7440-25-7	.01-1.10	5.0	-	5.0	-	No No
Titanium (Ti)	7440-32-6	.01-0.70	-	15	-	10	No No

NOTE: The above listing is a summary of elements used in alloying steel. Various grades of steel will contain different combinations of these elements. Trace elements may also be present in minute amounts. No permissible exposure limits (PEL) or thresholds limit values (TLV) exist for steel. Values shown are applicable to component elements.

II. PHYSICAL DATA

MATERIAL IS (At Normal Conditions) () LIQUID (X) SOLID () GAS () OTHER	APPEARANCE AND ODOR GREY-BLACK, ODORLESS	% VOLATILE BY VOLUME N/A	VAPOR DENSITY N/A
ACIDITY/ALKALINITY pH = N/A	Melting Point Approx. 2400-2800°F Boiling Point N/A °F	Specific Gravity (H ₂ O = 1) Approx. 8 Solubility in water N/A	VAPOR PRESSURE (MM Hg AT 20°C) N/A

III. PERSONAL PROTECTIVE EQUIPMENT

RESPIRATORY PROTECTION. Appropriate dust/mist/fume respirator should be used to avoid excessive inhalation of particulates. If exposure limits are reached or exceeded, use NIOSH approved equipment.	HANDS, ARMS AND BODY. Protective gloves should be worn as required for welding, burning or handling operations.
EYES AND FACE. Safety glasses should be worn when grinding or cutting. Face shields should be worn when welding or cutting or burning.	OTHER CLOTHING AND EQUIPMENT. As required depending on operations and safety codes.

IV. EMERGENCY MEDICAL PROCEDURES

INHALATION:	Remove to fresh air; if condition continues, consult a physician.
EYE CONTACT:	Flush thoroughly with running water to remove particulate; obtain medical attention.
SKIN CONTACT:	Remove particles by washing thoroughly with soap and water. Seek medical attention if condition persists.
INGESTION:	If significant amounts of metal are ingested, consult physician.

V. HEALTH/SAFETY INFORMATION

HEALTH	<p>Stainless steel products in their solid state present no inhalation, ingestion, or contact health hazard. Operations such as burning, welding, sawing, brazing, grinding, and machining, which result in elevating the temperature of the product to, or above its melting point, or result in the generation of airborne particulates may present hazards. The major exposure hazard is inhalation. Effects or overexposure to fume and dust are as follows:</p> <p>ACUTE: Excessive inhalation of metallic fumes and dust may result in irritation of eyes, nose and throat. High concentrations of fumes and dust of iron-oxide, manganese, copper and lead may result in metal fume fever. Typical symptoms last from 12 to 48 hours and consist of a metallic taste in the mouth, dryness and irritation of the throat, chills and fever.</p> <p>CHRONIC: Chronic and prolonged inhalation of high concentrations of fumes or dust of the following elements may lead to the conditions listed opposite the element:</p> <p>Aluminum: Irritation of the eyes, nose and throat Chromium: Lesions of the skin and mucous membranes, possibly cancer of the nose or lungs-bronchogenic carcinoma Cobalt: Respiratory tract irritation, skin rash Copper: Irritation of the eyes, nose and throat, metal fume fever Iron: Siderosis, pulmonary effects. Manganese: Bronchitis, pneumonitis, lack of coordination Molybdenum: Respiratory tract irritation, possible liver and kidney damage, bone deformity Nickel: Lesions of the skin and mucous membranes, possibly cancer of the nose or lungs-bronchogenic carcinoma Phosphorous: Necrosis of the mandible Selenium: Nasal and bronchial irritation, gastrointestinal disturbances, garlic breath odor Sulfur: (As sulfur dioxide) Edema of the lungs Titanium: No chronic debilitating symptoms indicated Columbium/Tantalum: No chronic debilitating symptoms indicated</p> <p>MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Individuals with chronic respiratory disorders (i.e.: asthma, chronic bronchitis, emphysema, etc.) may be adversely affected by any fume or airborne particulate matter exposure.</p> <p>OCCUPATIONAL EXPOSURE LIMITS: See Product Ingredients Section I. Chromium and Nickel have been identified by the International Agency for Research on Cancer (IARC) and/or the National Toxicology Program (NTP) as potential cancer causing agents.</p>			

FIRE & EXPLOSION	FLASH POINT N/A °F	AUTO IGNITION TEMPERATURE N/A	FLAMMABLE LIMITS IN AIR Lower N/A Upper N/A	EXTINGUISHING MEDIA Does not present fire or explosion hazards under normal conditions. Use dry powder or sand on molten metal.
	FIRE AND EXPLOSION HAZARDS Stainless products do not present fire or explosion hazards under normal conditions. Fine metal particles such as produced in grinding or sawing can burn. High concentrations of metallic fines in the air may present an explosion hazard.			EXTINGUISHING MEDIA Do not use water on molten metal or fires caused by fine metal particles.
REACTIVITY	STABILITY (X) Stable () Unstable		INCOMPATIBILITY (MATERIALS TO AVOID) Reacts with strong acids to form hydrogen gas.	
	CONDITIONS TO AVOID: Stainless steel at temperatures above the melting point may liberate fume containing oxides of iron and alloying elements.			
	HAZARDOUS DECOMPOSITION PRODUCTS: Metallic Dust or fumes may be produced during welding, burning grinding and possible machining. Refer to ANSI Z49.1.			

VI. ENVIRONMENTAL

SPILL OR LEAK PROCEDURES Fine turnings and small chips should be swept or vacuumed. Scrap metal can be reclaimed for re-use.	
WASTE DISPOSAL METHOD* Used or unused product should be disposed of in accordance with Federal, State or Local Laws and Regulations. *Disposer must comply with Federal, State and Local disposal or discharge laws.	

VII. ADDITIONAL INFORMATION

In welding, precautions should be taken for airborne contaminants which may originate from components of the welding rod.	
Arc or spark generated when welding or burning could be a source of ignition for combustion and flammable materials.	
DISCLAIMER The information in this MSDS was obtained from sources which we believe are reliable, however, the information is provided without any representation or warranty, expressed or implied, regarding the accuracy or correctness. The conditions or methods of handling, storage, use and disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of the product.	

MATERIAL SAFETY DATA SHEET

TRADE NAME (Common Name Or Synonym)
ALUMINUM ALLOY

CHEMICAL NAME
Alloy Series 1000, 2000, 3000, 5000, 6000 and 7000

I. INGREDIENTS

Material Or Component	CAS Number	% Weight	OSHA PEL (mg/m ³)		EXPOSURE LIMITS 8 Hour TWA ACGIH TLV (mg/m ³)		NTP Listed	IARC Listed
			DUST	FUME	DUST	FUME		
Base Metal Aluminum (Al)	7429-90-5	83.0-99.7	15	-	10	5	No	No
Alloying Elements								
Bismuth (Bi)	7440-69-9	0.40-0.7	-	-	-	-	No	No
Boron (B)	7440-42-8	0.06 Max	-	15	-	10	No	No
Chromium (Cr)	7440-47-3	0.01-0.4	1.0	-	.5	-	Yes	Yes
Cobalt (Co)	7440-48-4	1.0-10.00	.1	-	.1	-	No	No
Copper (Cu)	7440-50-8	0.05-6.0	1.0	.1	1.0	.2	No	No
Iron (Fe)	7439-89-6	0.35-1.0	-	10	-	5	No	No
Lead (Pb)	7439-92-1	0.40-0.7	.05	.05	.15	.15	No	Yes
Magnesium (Mg)	1309-48-4	0.03-4.9	-	15	-	10	No	No
Manganese (Mn)	7439-96-5	0.02-1.5	5	5	5	1	No	No
Nickel (Ni)	7440-02-0	.3 Max	1.0	-	1.0	-	Yes	Yes
Nitric Oxide	10102-43-9	N/A	-	30	-	30	No	No
Nitrogen Dioxide	10102-44-0	N/A	-	9	-	1.8	No	No
Ozone	10028-15-6	N/A	-	.2	-	.2	No	No
Silicon (Si)	7440-21-3	0.25-1.2	15	-	10	-	No	No
Tin (Sn)	7740-31-5	1.0-10.00	2.0	2.0	2.0	2.0	No	No
Titanium (Ti)	7440-32-6	0.02-0.2	-	15.0	-	10	No	No
Vandium (V)	7440-62-2	0.05 Max	.5	.1	.05	.05	No	No
Zinc (Zn)	1314-13-2	0.05-6.1	-	5	10	5	No	No

NOTE: Aluminum alloys will be comprised of various combinations of the elements shown above. In addition, other alloying elements may be present in minute quantities. No permissible exposure limits (PEL) or threshold limit values (TLV) exist for aluminum alloys. Values shown are applicable to component elements.

II. PHYSICAL DATA

MATERIAL IS (At Normal Conditions) () LIQUID (X) SOLID () GAS () OTHER		APPEARANCE AND ODOR SILVERY-GREY, ODORLESS	% VOLATILE BY VOLUME N/A	VAPOR DENSITY N/A
ACIDITY/ALKALINITY pH = N/A	Melting Point Approx. 900-1200°F Boiling Point N/A °F	Specific Gravity (H ₂ O = 1) Approx. 2.5-2.9 Solubility in water (% by weight) NEGLIGIBLE		VAPOR PRESSURE (MM Hg AT 20°C) N/A

III. PERSONAL PROTECTIVE EQUIPMENT

RESPIRATORY PROTECTION. Appropriate dust/mist/fume respirator should be used to avoid excessive inhalation of particulates. If exposure limits are reached or exceeded, use NIOSH approved equipment.	HANDS, ARMS AND BODY. Protective gloves should be worn as required for welding, burning or handling operations.
EYES AND FACE. Safety glasses should be worn when grinding or cutting. Face shields should be worn when welding, cutting or burning.	OTHER CLOTHING AND EQUIPMENT. As required depending on operations and safety codes.

IV. EMERGENCY MEDICAL PROCEDURES

INHALATION:	Remove to fresh air; if condition continues, consult a physician.
SKIN CONTACT:	Flush thoroughly with running water to remove particulate; obtain medical attention.
EYE CONTACT:	Remove particles by washing thoroughly with soap and water. Seek medical attention if condition persists.
INGESTION:	If significant amounts of metal are ingested, consult physician.

V. HEALTH/SAFETY INFORMATION

HEALTH	For standard operations (e.g. melting, cutting, grinding), aluminum alloys present a low health risk by inhalation and are usually considered a nuisance dust. Toxicity by ingestion-none expected. Skin and eyes-not an irritant. Welding and plasma cutting of alloys high in copper (2000 and 7000 series) may present the potential for overexposure to copper fumes which result in upper respiratory tract irritation, nausea, and metal fume fever. Nickel and chromium are other alloying elements considered hazardous as fume; however, they do not present carcinogenic or other health concern due to their low concentrations of the chemical form in which they are present. Overexposure to lead fumes over an extended period of time can result in such toxic effects as central nervous system disturbances, renal changes, peripheral neuropathy, gastrointestinal disturbances, anemia, and chromosomal changes. The welding of aluminum alloys may generate carbon monoxide, carbon dioxide, ozone nitrogen oxides, infrared radiation and ultraviolet radiation.			
	MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: See Product Ingredients Section I			

FIRE & EXPLOSION	FLASH POINT N/A °F	AUTO IGNITION TEMPERATURE N/A	FLAMMABLE LIMITS IN AIR Lower N/A % Upper N/A %		EXTINGUISHING MEDIA For molten aluminum use dry powder or sand.
	DAMP ALUMINUM DUST MAY SPONTANEOUSLY HEAT WITH LIBERATION OF HYDROGEN TO FORM EXPLOSIVE AIR MIXTURES. SEE ADDITIONAL INFORMATION			EXTINGUISHING MEDIA NOT TO BE USED Do not use water or halogen agents on molten aluminum	
REACTIVITY	STABILITY (X) Stable () Unstable		INCOMPATIBILITY (MATERIALS TO AVOID) Reacts with strong acids to form hydrogen gas.		
	CONDITIONS TO AVOID: Aluminum products under normal conditions are stable during use, storage and transportation. Halogen acids and sodium hydroxide in contact with aluminum may generate explosive mixtures of hydrogen. Finely divided aluminum, such as small chips and fines, will form explosive mixtures in air. It also will form explosive mixtures in air in the presence of bromates, iodates, or ammonium nitrate. Strong oxidizers cause violent reactions with considerable heat generation.				

VI. ENVIRONMENTAL

SPILL OR LEAK PROCEDURES Fine turnings and small chips should be swept or vacuumed. Scrap metal can be reclaimed for re-use.	
WASTE DISPOSAL METHOD* Used or unused product should be disposed of in accordance with Federal, State or Local Laws and Regulations. *Disposer must comply with Federal, State and Local disposal or discharge laws.	

VII. ADDITIONAL INFORMATION

<ol style="list-style-type: none">Acids and bases in contact with aluminum may generate explosive mixtures with hydrogenFinely divided aluminum will form explosive mixtures in air. It will also form explosive mixtures in air in the presence of bromates, iodates, or ammonium nitrate.When remelting aluminum scrap, entrapped moisture or the presence of strong oxidizers such as ammonium nitrate could cause an explosion. This applies to the collection of moisture in saw cavities as well. Moisture must be driven off prior to remelting.Do not touch cast aluminum metal or heated aluminum product without knowing metal temperature. Aluminum experiences no color change during heating. If metal is hot and touched, burns can result.Aluminum powder must be packaged and shipped as a Flammable Solid.Hard alloy ingots in the 2000 and 7000 series must be stress-relieved to prevent explosion (or violent cracking) when sawed.The welding of aluminum alloys may generate carbon monoxide, carbon dioxide, ozone, nitrogen oxides, infra-red radiation and ultra-violet radiation, in addition to metal fume.Some aluminum scrap may be contaminated with oil at levels greater than 1%. Melting of aluminum scrap may generate oil vapors which are irritating to the eyes and upper respiratory tract. Prolonged or repeated skin contact with oil may cause skin irritation.Vapor degreaser must be properly maintained to limit the accumulation of aluminum fines. The accumulation of aluminum fines could result in a potential degreaser fire or explosion.Beryllium, Chromium, Lead, Cadmium and Nickel, listed on California's Proposition 65 list of "Chemicals Known to the State to Cause Cancer or Reproductive Harm", may exist in this product at the following maximum concentrations by weight - Beryllium (0.05%), Chromium (0.10%), Lead(0.05%), Cadmium (0.05%) and Nickel (1.20%).	
DISCLAIMER The information in this MSDS was obtained from sources which we believe are reliable, however, the information is provided without any representation or warranty, expressed or implied, regarding the accuracy or correctness. The conditions or methods of handling, storage, use and disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of the product.	

MATERIAL SAFETY DATA SHEET

TRADE NAME (Common Name Or Synonym)

COPPER

COPPER LEADTEX SHEET

CHEMICAL NAME

COPPER/COPPER ALLOY

I. INGREDIENTS

Material Or Component	CAS Number	% Weight	EXPOSURE LIMITS				NTP Listed	IARC Listed
			OSHA PEL (mg/m³)		ACGIH TLV (mg/m³)			
			8-HR TWA		8-HR TWA			
			DUST	FUME	DUST	FUME		
Base Metal Copper #(Cu)	7440-50-8	55-99	1	.1	1	.2	No	No
Alloying Elements								
Aluminum (Al)#	7429-90-5	0-5	15	5	10	5	No	No
Antimony (Sb)#	7440-36-0	0-35	.5	-	.5	-	No	No
Arsenic (AS)#	7440-38-2	0-1	.5	-	-	.02	Yes	Yes
Beryllium (Be)#	7440-41-7	0-2.75	.002	-	-	.002	Yes	Yes
Cadmium (Cd)#	7440-43-9	0-15	.2	.1	.05	.05	Yes	Yes
Carbonblack (c)	1333-86-4	0-04	3.5	-	-	-	No	No
Chromium (Cr)#	7440-47-3	0-1.5	1	-	-	-	Yes	Yes
Cobalt (Co)#	7440-48-4	0-2.7	.05	-	.1	-	No	No
Iron (Fe)	1309-37-1	0-4	10	-	5	-	No	No
Lead Pb#	7439-92-1	0-4.0	.05	-	.15	-	No	Yes
Manganese (Mn)#	7439-96-5	0-5	5	-	5	1	No	No
Nickel (Ni)#	7440-02-0	0-4.5	1	-	1	-	Yes	Yes
Phosphorus (P)#	7723-14-0	0-04	.1	-	.1	-	No	No
Silicon (Si)#	7440-21-3	0-5	10	5	10	-	No	No
Silver (Ag)#	7440-22-4	0-1.0	.01	-	.1	-	No	No
Sulphur Dioxide (SO2)#	7446-09-5	0-1.0	5	-	5	-	No	No
Tellurium (Te)	13494-80-9	0-6	.1	-	.1	-	No	No
Tin (Sn)	7440-31-5	0-2.0	2	-	2	-	No	No
Zinc (Zn)#	1314-13-2	0-4.2	10	5	10	5	No	No
Zirconium (Zr)	7440-67-7	0-35	5	-	5	-	No	No

NOTE: Antimony, trioxide, beryllium cadmium, chromium, cobalt-chromium alloy, lead, and nickel have been identified as potential human carcinogens. # denotes a toxic chemical or chemical subject to reporting requirements of Section 313 of Title III of the S.A.R.A. of 1986 and CFR Part 372

II. PHYSICAL DATA

MATERIAL IS (At Normal Conditions) () LIQUID (X) SOLID () GAS () OTHER		APPEARANCE AND ODOR SILVER OR YELLOW TORRID	% VOLATILE BY VOLUME N/A	VAPOR DENSITY N/A
ACIDITY/ALKALINITY pH = N/A	Melting Point Approx. 2260°F Boiling Point N/A °F	Specific Gravity (H ₂ O = 1) Approx. 8-9 Solubility in water (% by weight) NEGLIGIBLE		VAPOR PRESSURE (MM Hg AT 20°C) N/A

III. PERSONAL PROTECTIVE EQUIPMENT

RESPIRATORY PROTECTION. Appropriate dust/mist/fume respirator should be used to avoid excessive inhalation of particulates. If exposure limits are reached or exceeded, use NIOSH approved equipment.	HANDS, ARMS AND BODY. Protective gloves should be worn as required for welding, burning or handling operations.
EYES AND FACE. Safety glasses should be worn when grinding or cutting. Face shields should be worn when welding, cutting or burning.	OTHER CLOTHING AND EQUIPMENT. As required depending on operations and safety codes.

IV. EMERGENCY MEDICAL PROCEDURES

INHALATION:	Remove to fresh air; if condition continues, consult a physician.
SKIN CONTACT:	Flush thoroughly with running water to remove particulate; obtain medical attention.
EYE CONTACT:	Remove particles by washing thoroughly with soap and water. Seek medical attention if condition persists.
INGESTION:	If significant amounts of metal are ingested, consult physician.

V. HEALTH/SAFETY INFORMATION

HEALTH

Copper products in their solid state present no inhalation, ingestion, or contact health hazard. Operations such as burning, welding, sawing, brazing, grinding, and machining, which result in elevating the temperature of the product to, or above its melting point, or result in the generation of airborne particulates may present hazards. The major exposure hazard is inhalation. *Effects or overexposure to fume and dust are as follows:* The exposure levels in Section II are relevant to Fumes and Dust. Route(s) of entry: inhalation, skin, ingestion.

ACUTE: Excessive inhalation of metallic fumes and dust may result in irritation of eyes, nose and throat. High concentrations of fumes and dust of iron-oxide, manganese, copper, zinc and lead may result in metal fume fever. Typical symptoms last from 12 to 48 hours and consist of a metallic taste in the mouth, dryness and irritation of the throat, chills and fever.

CHRONIC: Chronic and prolonged inhalation of high concentrations of fumes or dust of the following elements may lead to the conditions listed opposite the element:

Aluminum: May initiate fibrotic changes to lung tissue

Antimony: Irritating to the skin and mucous membranes and are systemic poisons

Arsenic: If Nervous system is affected, death could result

Beryllium: Suspected carcinogen. Systemic disease. Damage to lungs and heart

Cadmium: Suspected carcinogen. Severe damage to lungs, kidney, liver, - could be fatal

Chromium: Suspected carcinogen. Lesions of the skin and mucous membranes.

Cobalt: Capable of producing serious pneumoconiosis

Copper: Fumes may give metal Fume Fever and nausea

Iron: Siderosis, pulmonary effects.

Lead: Is an accumulative poison. Anemia, urinary dysfunction, nervous disorder

Manganese: May damage central nervous system, bronchitis, pneumantitis

Nickel: Suspected carcinogen, allergic dermatitis

Phosphorous: Necrosis of the mandible

Sulfur: (As sulfur dioxide) Edema of the lungs

Zinc: Metal Fume fever, bronchitis or pneumonia

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Individuals with chronic respiratory disorders (i.e.: asthma, chronic bronchitis, emphysema, etc.) may be adversely affected by any fume or airborne particulate matter exposure.

OCCUPATIONAL EXPOSURE LIMITS: See Product Ingredients Section I. Arsenic, Beryllium, Cadmium, Lead, Chromium and Nickel have been identified by the International Agency for Research on Cancer (IARC) and/or the National Toxicology Program (NTP) as potential cancer causing agents.

FIRE & EXPLOSION	FLASH POINT N/A °F	AUTO IGNITION TEMPERATURE N/A	FLAMMABLE LIMITS IN AIR Lower N/A Upper N/A	EXTINGUISHING MEDIA Use dry powder or sand on molten metal.
	FIRE AND EXPLOSION HAZARDS Copper products do not present fire or explosion hazards under normal conditions. Fine metal particles such as produced in grinding or sawing can burn. High concentrations of metallic fines in the air may present an explosion hazard.			EXTINGUISHING MEDIA Do not use water on molten metal or fires.
REACTIVITY	STABILITY (X) Stable () Unstable		INCOMPATIBILITY (MATERIALS TO AVOID) Acids, Bases and Oxidizers Reacts with strong acids to form hydrogen gas.	
	CONDITIONS TO AVOID: Copper at temperatures above the melting point may liberate fume containing oxides of iron and alloying elements. Avoid generation of airborne Fume and dust.			
	HAZARDOUS DECOMPOSITION PRODUCTS: Metallic Dust or fumes may be produced during welding, burning grinding and possible machining. Refer to ANSI Z49.1.			

VI. ENVIRONMENTAL

		SPILL OR LEAK PROCEDURES Fine turnings and small chips should be swept or vacuumed. Scrap metal can be reclaimed for re-use.
		WASTE DISPOSAL METHOD* Used or unused product should be disposed of in accordance with Federal, State or Local Laws and Regulations. *Disposer must comply with Federal, State and Local disposal or discharge laws.

VII. ADDITIONAL INFORMATION

In welding, precautions should be taken for airborne contaminants which may originate from components of the welding rod.	
Arc or spark generated when welding or burning could be a source of ignition for combustion and flammable materials.	
DISCLAIMER The information in this MSDS was obtained from sources which we believe are reliable, however, the information is provided without any representation or warranty, expressed or implied, regarding the accuracy or correctness. The conditions or methods of handling, storage, use and disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of the product.	

MATERIAL SAFETY DATA SHEET

TRADE NAME (Common Name Or Synonym)

CHEMICAL NAME

BRASS, LEADED BRASS

BRASS, COPPER ALLOY

I. INGREDIENTS

Material Or Component	CAS Number	% Weight	EXPOSURE LIMITS				NTP Listed	IARC Listed
			OSHA PEL (mg/m³)		ACGIH TLV (mg/m³)			
			8-hr TWA		8-HR TWA			
			DUST	FUME	DUST	FUME		
Base Metal Copper #(cu)	7440-50-8	55-72	1	2	1	.1	No	No
Alloying Elements								
Lead (Pb)#	7439-92-1	0-3.5		.05		.15	No	Yes
Tin (Sn)	7440-31-5	0-1	2		2		No	No
Zinc (Zn)#	7440-66-6	35-45	10	5	10	5	No	No

NOTE: Lead has been identified as a potential human carcinogen. # denotes a toxic chemical subject to the reporting requirements of Section 313 of Title III for the S.A.R.A. of 1986 and CFR Part 372

II. PHYSICAL DATA

MATERIAL IS (At Normal Conditions) () LIQUID (X) SOLID () GAS () OTHER		APPEARANCE AND ODOR GOLD/YELLOW	% VOLATILE BY VOLUME N/A	VAPOR DENSITY (mm Hg at 20°C) N/A
ACIDITY/ALKALINITY pH = N/A	Melting Point Approx. 1600°F Boiling Point N/A °F	Specific Gravity (H ₂ O = 1) Approx. 8-9 Solubility in water (% by weight) N/A	VAPOR PRESSURE (MM Hg AT 20°C) N/A	

III. PERSONAL PROTECTIVE EQUIPMENT

RESPIRATORY PROTECTION. Appropriate dust/mist/fume respirator should be used to avoid excessive inhalation of particulates. If exposure limits are reached or exceeded, use NIOSH approved equipment.	HANDS, ARMS AND BODY. Protective gloves should be worn as required for welding, burning or handling operations.
EYES AND FACE. Safety glasses should be worn when grinding or cutting. Face shields should be worn when welding, cutting or burning.	OTHER CLOTHING AND EQUIPMENT. As required depending on operations and safety codes.

IV. EMERGENCY MEDICAL PROCEDURES

INHALATION: Remove to fresh air; if condition continues, consult a physician.	
EYE CONTACT: Flush thoroughly with running water to remove particulate; obtain medical attention.	
SKIN CONTACT: Remove particles by washing thoroughly with soap and water. Seek medical attention if condition persists.	
INGESTION: If significant amounts of metal are ingested, consult physician.	

V. HEALTH/SAFETY INFORMATION

HEALTH	<p>Brass products in their solid state present no inhalation, ingestion, or contact health hazard. Operations such as burning, welding, sawing, brazing, grinding, and machining, which result in elevating the temperature of the product to, or above its melting point, or result in the generation of airborne particulates may present hazards. The major exposure hazard is inhalation. Effects or overexposure to fume and dust are as follows:</p> <p>ACUTE: Excessive inhalation of metallic fumes and dust may result in irritation of eyes, nose and throat. High concentrations of fumes and dust of copper, zinc and lead may result in metal fume fever. Typical symptoms last from 12 to 48 hours and consist of a metallic taste in the mouth, dryness and irritation of the throat, chills and fever.</p> <p>CHRONIC: Chronic and prolonged inhalation of high concentrations of fumes or dust of the following elements may lead to the conditions listed opposite the element:</p> <p>Copper: Fumes may cause skin and hair to discolor and cause irritation to skin, nose, mouth, eyes and lungs leading to pulmonary disease.</p> <p>Lead: Fumes can cause lead poisoning characterized by nausea vomiting, and diarrhea. Prolonged exposure can result in kidney damage, central nervous system disorders and ultimately death.</p> <p>Tin: Dust may cause irritation of the skin or mucous membranes and result in a benign pneumoconiosis.</p> <p>Zinc: Metal Fume fever, with flu like symptoms</p> <p>MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Individuals with chronic respiratory disorders (i.e.: asthma, chronic bronchitis, emphysema, etc.) may be adversely affected by any fume or airborne particulate matter exposure.</p> <p>OCCUPATIONAL EXPOSURE LIMITS: See Product Ingredients Section I. Lead has been identified by the International Agency for Research on Cancer (IARC) and/or the National Toxicology Program (NTP) as a potential cancer causing agent.</p>
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FIRE & EXPLOSION	FLASH POINT N/A °F	AUTO IGNITION TEMPERATURE N/A	FLAMMABLE LIMITS IN AIR Lower N/A Upper N/A	EXTINGUISHING MEDIA Does not present fire or explosion hazards under normal conditions. Use dry powder or sand on molten metal. Do not use water on molten metal
	FIRE AND EXPLOSION HAZARDS Brass products do not present fire or explosion hazards under normal conditions. Fine metal particles such as produced in grinding or sawing can burn. High concentrations of metallic fines in the air may present an explosion hazard.			Do not use water on molten metal or fires caused by fine metal particles.
REACTIVITY	STABILITY (X) Stable () Unstable		INCOMPATIBILITY (MATERIALS TO AVOID) Incompatible with acids, bases and oxidizers. Copper reacts violently with acetylene	
	CONDITIONS TO AVOID: Brass temperatures above the melting point may liberate fume containing oxides and alloying elements. Avoid generation of airborne fume and dust.			
	HAZARDOUS DECOMPOSITION PRODUCTS: Metallic Dust or fumes may be produced during welding, burning grinding and possible machining. Refer to ANSI Z49.1.			

VI. ENVIRONMENTAL

SPILL OR LEAK PROCEDURES Fine turnings and small chips should be swept or vacuumed. Scrap metal can be reclaimed for re-use.
WASTE DISPOSAL METHOD* Used or unused product should be disposed of in accordance with Federal, State or Local Laws and Regulations. *Disposer must comply with Federal, State and Local disposal or discharge laws.

VII. ADDITIONAL INFORMATION

<p>In welding, precautions should be taken for airborne contaminants which may originate from components of the welding rod.</p> <p>Arc or spark generated when welding or burning could be a source of ignition for combustion and flammable materials.</p>
DISCLAIMER The information in this MSDS was obtained from sources which we believe are reliable, however, the information is provided without any representation or warranty, expressed or implied, regarding the accuracy or correctness.
<p>The conditions or methods of handling, storage, use and disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of the product.</p>

MATERIAL SAFETY DATA SHEET

TRADE NAME (Common Name Or Synonym)

CHEMICAL NAME

BRONZE

ALUMINUM/MANGANESE/LEADED BRONZE

I. INGREDIENTS

Material Or Component	CAS Number	% Weight	EXPOSURE LIMITS				NTP Listed	IARC Listed	
			OSHA PEL (mg/m³)		ACGIH TLV (mg/m³)				
			8-hr TWA		8-HR TWA				
			DUST	FUME	DUST	FUME			
Base Metal Copper (cu)	7440-50-8	58-91	1.0	.1		1.0	.2	No	No
Alloying Elements									
Aluminum (Al)	7429-90-5	1.0-14.1	15	-		10.0	5.0	No	No
Iron (Fe)	7439-89-6	1.0-5.0		10		-	5	No	No
Manganese (Mn)	7439-96-5	0-3.5	5	5		5	1.0	No	No
Nickel (Ni)	7440-02-0	0-5.1	1.0	-		1.0	-	Yes	Yes
Tin (Sn)	7440-31-5	0-25	2.0	-		2.0	-	No	No
Zinc (Zn)	1314-13-2	0-39.5	10	5		10	5	No	No

NOTE: The above listing is a summary of elements used in alloying bronze. Various grades of bronze will contain different combinations of these elements. Trace elements may also be present in minute amounts. No permissible exposure limits (PEL) or thresholds limit values (TLV) exist for bronze. Values shown are applicable to component elements.

II. PHYSICAL DATA

MATERIAL IS (At Normal Conditions) () LIQUID (X) SOLID () GAS () OTHER		APPEARANCE AND ODOR RED/GOLD	% VOLATILE BY VOLUME N/A	VAPOR DENSITY (mm Hg at 20°C) N/A
ACIDITY/ALKALINITY pH = N/A	Melting Point Approx. 1820°F Boiling Point N/A °F	Specific Gravity (H ₂ O = 1) Approx. 8 Solubility in water (% by weight) N/A	VAPOR PRESSURE (MM Hg AT 20°C) N/A	

III. PERSONAL PROTECTIVE EQUIPMENT

RESPIRATORY PROTECTION. Appropriate dust/mist/fume respirator should be used to avoid excessive inhalation of particulates. If exposure limits are reached or exceeded, use NIOSH approved equipment.	HANDS, ARMS AND BODY. Protective gloves should be worn as required for welding, burning or handling operations.
EYES AND FACE. Safety glasses should be worn when grinding or cutting. Face shields should be worn when welding, cutting or burning.	OTHER CLOTHING AND EQUIPMENT. As required depending on operations and safety codes.

IV. EMERGENCY MEDICAL PROCEDURES

INHALATION: Remove to fresh air; if condition continues, consult a physician.	
EYE CONTACT: Flush thoroughly with running water to remove particulate; obtain medical attention.	
SKIN CONTACT: Remove particles by washing thoroughly with soap and water. Seek medical attention if condition persists.	
INGESTION: If significant amounts of metal are ingested, consult physician.	

V. HEALTH/SAFETY INFORMATION

HEALTH	<p>Bronze products in their solid state present no inhalation, ingestion, or contact health hazard. Operations such as burning, welding, sawing, brazing, grinding, and machining, which result in elevating the temperature of the product to, or above its melting point, or result in the generation of airborne particulates may present hazards. The major exposure hazard is inhalation. Effects or overexposure to fume and dust are as follows:</p> <p>ACUTE: Excessive inhalation of metallic fumes and dust may result in irritation of eyes, nose and throat. High concentrations of fumes and dust of iron oxide manganese copper, zinc and lead may result in metal fume fever. Typical symptoms last from 12 to 48 hours and consist of a metallic taste in the mouth, dryness and irritation of the throat, chills and fever.</p> <p>CHRONIC: Chronic and prolonged inhalation of high concentrations of fumes or dust of the following elements may lead to the conditions listed opposite the element:</p> <p>Aluminum: May initiate fibrotic changes to lung tissue</p> <p>Copper: Fumes may cause skin and hair to discolor and cause irritation to skin, nose, mouth, eyes and lungs leading to pulmonary disease.</p> <p>Iron: Siderosis, pulmonary effects</p> <p>Lead: Fumes can cause lead poisoning characterized by nausea vomiting, and diarrhea. Prolonged exposure can result in kidney damage, central nervous system disorders and ultimately death.</p> <p>Nickel: Suspected carcinogen. Allergic dermatitis</p> <p>Tin: Dust may cause irritation of the skin or mucous membranes and result in a benign pneumoconiosis.</p> <p>Zinc: Metal Fume fever, with flu like symptoms</p> <p>MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Individuals with chronic respiratory disorders (i.e.: asthma, chronic bronchitis, emphysema, etc.) may be adversely affected by any fume or airborne particulate matter exposure.</p> <p>OCCUPATIONAL EXPOSURE LIMITS: See Product Ingredients Section I. Lead and Nickel have been identified by the International Agency for Research on Cancer (IARC) and/or the National Toxicology Program (NTP) as potential cancer causing agent.</p>			

FIRE & EXPLOSION	FLASH POINT N/A °F	AUTO IGNITION TEMPERATURE N/A	FLAMMABLE LIMITS IN AIR Lower N/A Upper N/A	EXTINGUISHING MEDIA Does not present fire or explosion hazards under normal conditions. Use dry powder or sand on molten metal. Do not use water on molten metal
	FIRE AND EXPLOSION HAZARDS Bronze products do not present fire or explosion hazards under normal conditions. Fine metal particles such as produced in grinding or sawing can burn. High concentrations of metallic fines in the air may present an explosion hazard.			
REACTIVITY	STABILITY (X) Stable () Unstable		INCOMPATIBILITY (MATERIALS TO AVOID) Incompatible with acids, bases and oxidizers. Copper reacts violently with acetylene	
	CONDITIONS TO AVOID: Bronze temperatures above the melting point may liberate fume containing oxides and alloying elements. Avoid generation of airborne fume and dust.			
	HAZARDOUS DECOMPOSITION PRODUCTS: Metallic Dust or fumes may be produced during welding, burning grinding and possible machining. Refer to ANSI Z49.1.			

VI. ENVIRONMENTAL

SPILL OR LEAK PROCEDURES Fine turnings and small chips should be swept or vacuumed. Scrap metal can be reclaimed for re-use.	
WASTE DISPOSAL METHOD* Used or unused product should be disposed of in accordance with Federal, State or Local Laws and Regulations. *Disposer must comply with Federal, State and Local disposal or discharge laws.	

VII. ADDITIONAL INFORMATION

In welding, precautions should be taken for airborne contaminants which may originate from components of the welding rod.	
Arc or spark generated when welding or burning could be a source of ignition for combustion and flammable materials.	
DISCLAIMER The information in this MSDS was obtained from sources which we believe are reliable, however, the information is provided without any representation or warranty, expressed or implied, regarding the accuracy or correctness. The conditions or methods of handling, storage, use and disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of the product.	

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